

# Kinetic energy climatology of anisotropic oceanic features

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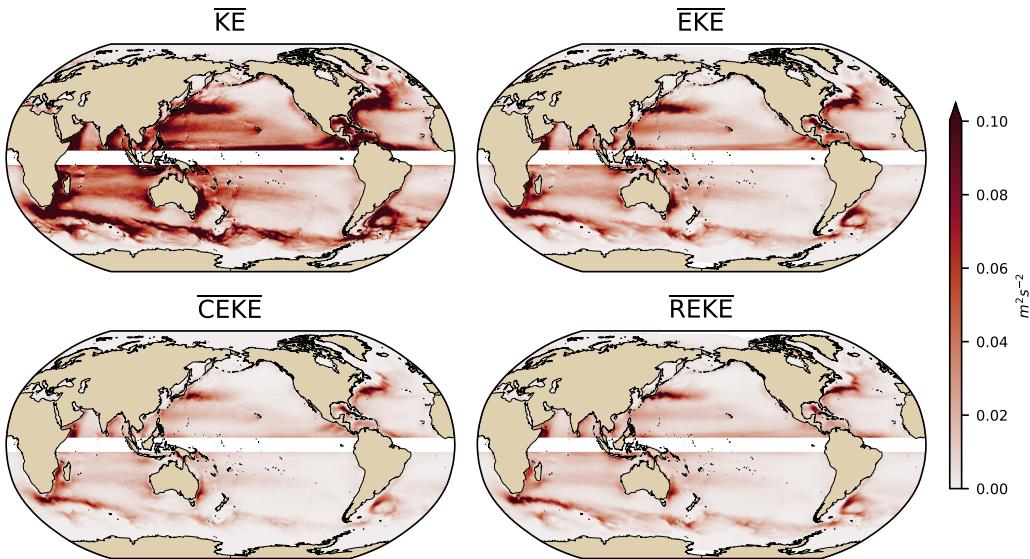
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## Key Points:

- Kinetic energy climatology reveals a surprising heterogeneity in the global ocean.
- Transient kinetic energy show significant increasing trends over large areas of the Southern Ocean and the Northern Hemisphere.
- Regional kinetic energy climatology strongly depends to the region dominant oceanic process.

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**Figure 1.** Caption

## Abstract

Ocean currents

## Plain summary

## 1 Introduction

Ocean currents are highly anisotropic and include coherent vortices and meandering jets. While coherent vortices (recirculating currents) are approximated as ellipses with axes smaller than the Rossby radius of deformation ( $R_D$ ), meandering jets are narrow but elongated currents. The anisotropic nature of these features translates in ...

## 2 Methods

## 3 Results

### 3.1 Climatology

- Figure 1 shows regions with high values of Kinetic Energy at the Western Boundary Currents, ACC, and ocean gyres.
- $\overline{EKE}$  Explains 70% of  $\overline{KE}$ , while  $\overline{CEKE}$  is 40% of  $\overline{EKE}$  and  $\overline{REKE}$  is 60% of  $\overline{EKE}$

- Maps show that  $\overline{KE}$ ,  $\overline{EKE}$ ,  $\overline{CEKE}$ , and  $\overline{REKE}$  are dominated by the western boundary currents, the Antarctic Circumpolar Current (ACC).

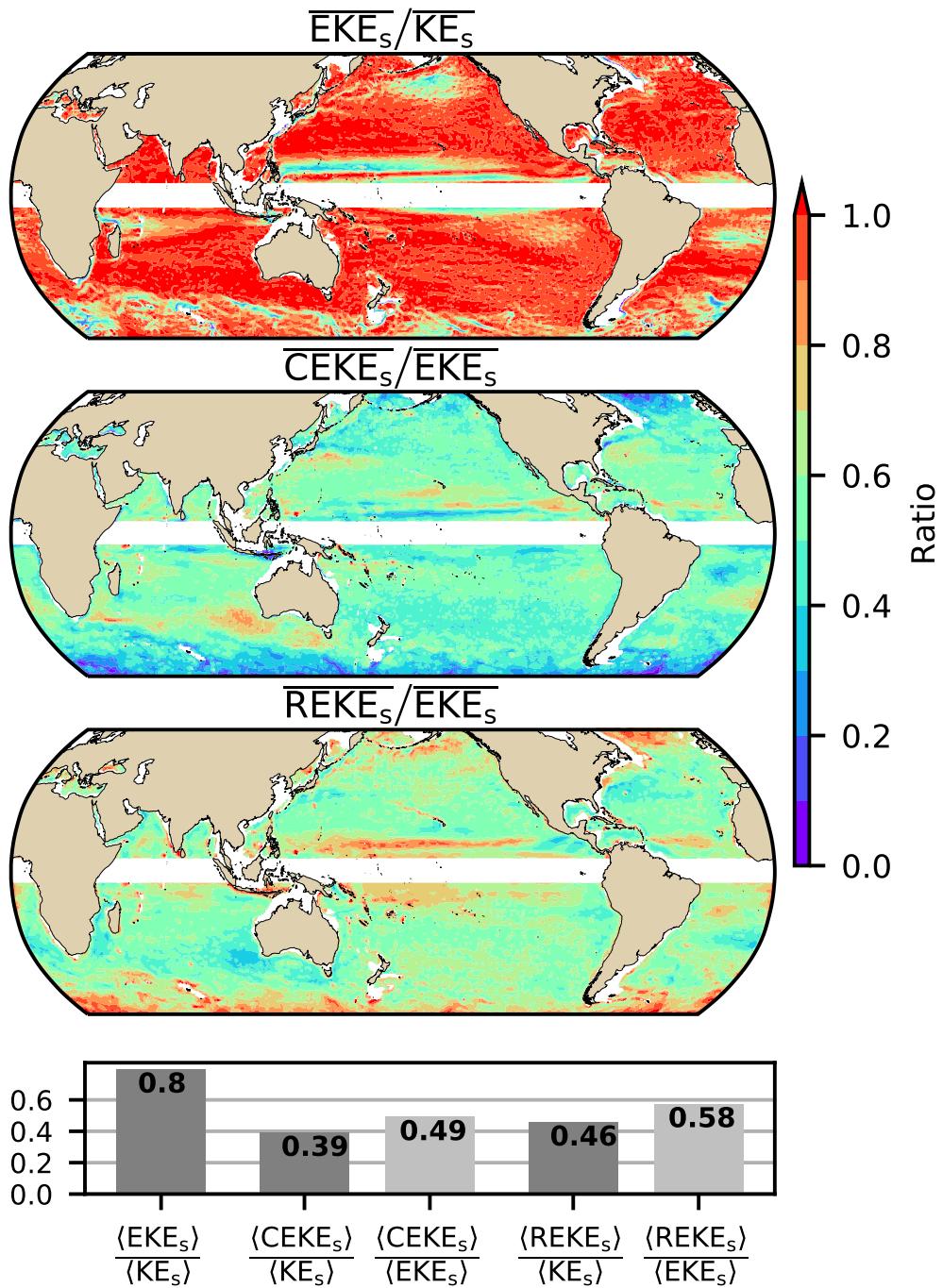
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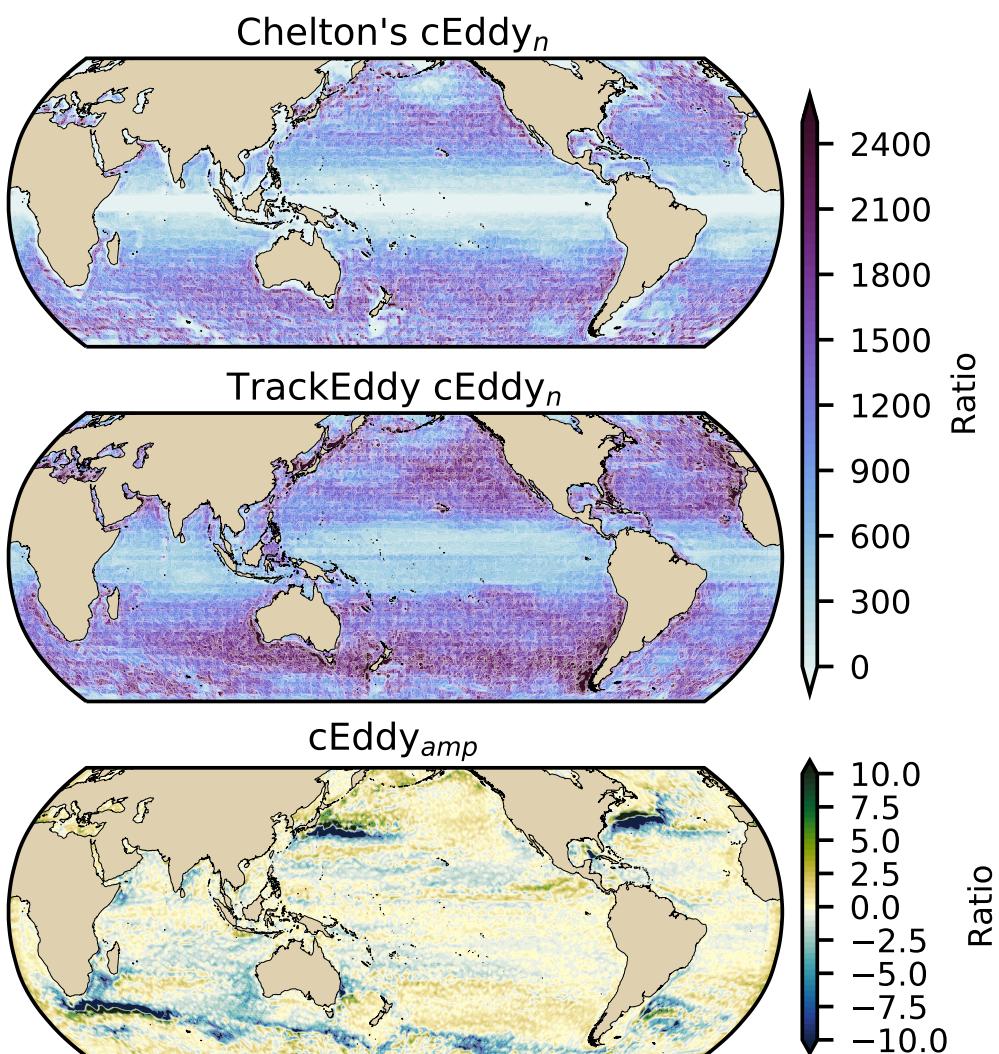
### **3.2 Seasonality**

## **4 Summary and Conclusions**

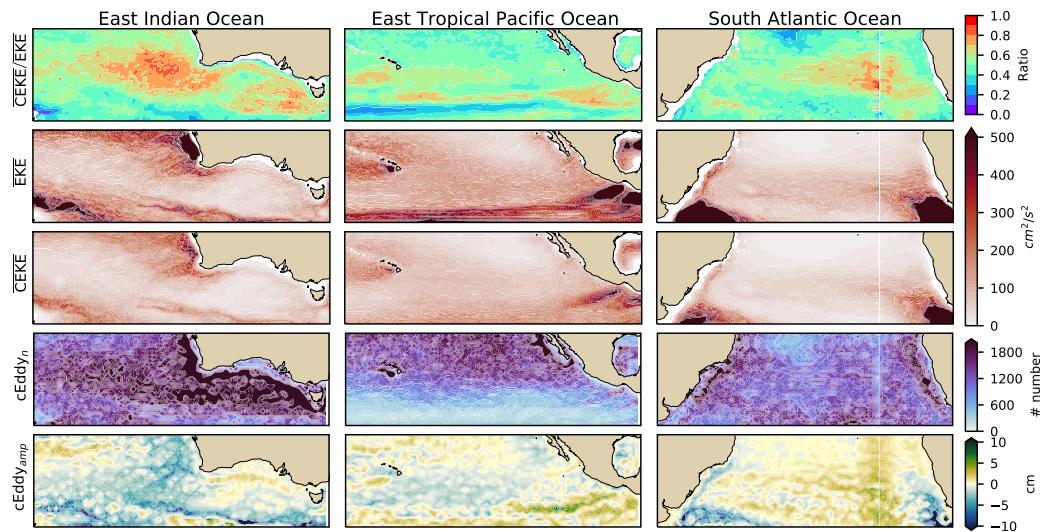
### **Acknowledgments**

### **References**

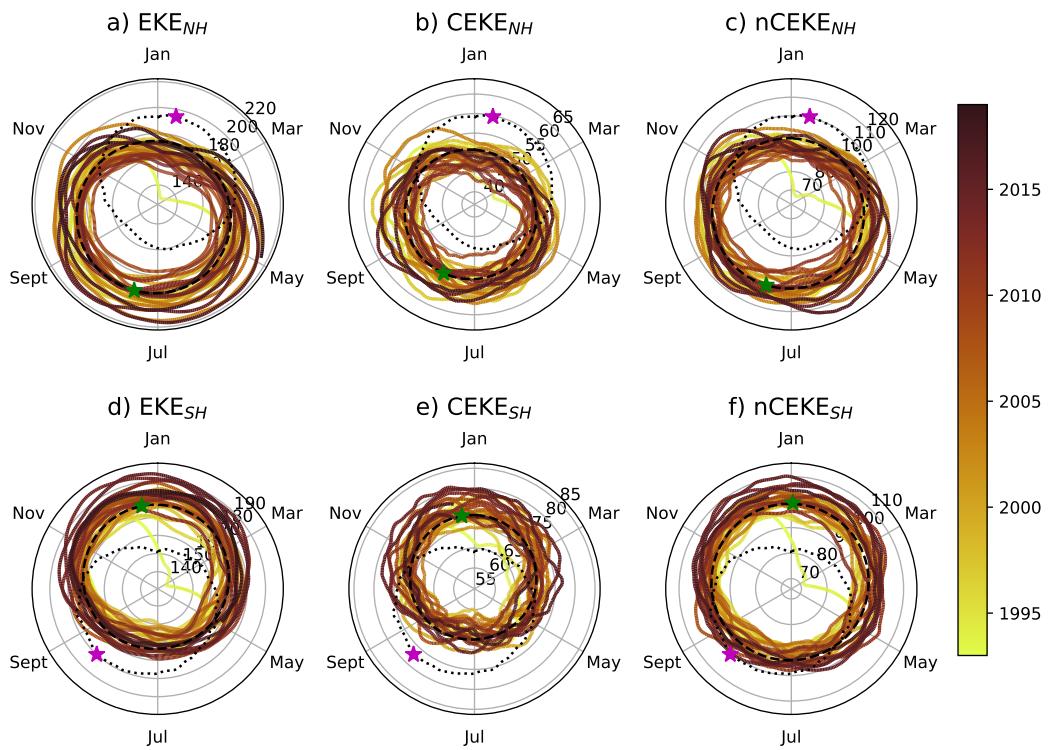
**Figure 2.** Ratios of the kinetic energy components. a)



**Figure 3.** Ratios of the kinetic energy components. a)



**Figure 4.** Climatology of regional statistics of the eddy field and coherent eddy field for the East Indian Ocean, East Tropical Pacific Ocean and South Atlantic Ocean. a-c Zoom to ratio of CEKE and EKE; d-f mean eddy kinetic energy ( $\overline{EKE}$ ); g-i mean coherent eddy kinetic energy ( $\overline{CEKE}$ ); j-k count of identified coherent eddies between 1993-2019; and l-n mean coherent eddy amplitude between 1993-2019.



**Figure 5.** Dashed lines correspond to the seasonal climatology of the fields. Dotted lines show the climatology of the wind magnitude. The green and magenta stars show the maximum of the seasonal cycle for the kinetic energy components and the wind magnitude, respectively.